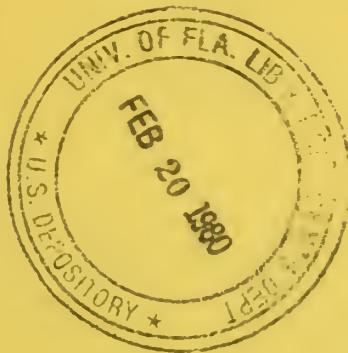


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Monthly Performance Report

HELIO THERMICS, INC. - LOT 6

FEBRUARY 1979



U.S. Department of Energy

National Solar Heating and
Cooling Demonstration Program

National Solar Data Program

NOTICE

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MONTHLY PERFORMANCE REPORT

HELIOTHERMICS, INC.
HOUSE LOT 6

FEBRUARY 1979

I. SYSTEM DESCRIPTION

The Helio-Thermics Inc., House Lot 6 is one of two instrumented single-family residences in Greenville, South Carolina. The home has approximately 1086 square feet of conditioned space. Solar energy is used for space heating the home and preheating domestic hot water (DHW). The solar energy system utilizes the attic space as the solar energy collector. The attic roof faces 10 degrees west of south and is pitched at an angle of 51 degrees from the horizontal. Solar energy enters the attic through a 416-square-foot aperture which is double-glazed with corrugated, translucent, fiberglass-reinforced, acrylic panels. The interior of the attic is painted black to maximize the absorption of solar energy. Warm air accumulates in the peak of the attic roof and circulates through the conditioned space or through storage by an air handler. Solar energy is stored in an 870-cubic-foot storage bin containing 85,460 pounds of crushed rock. The bin is located under the house and is insulated with 2-inch polystyrene insulation. Cold water is preheated in the attic by thermosiphoning water from the 80-gallon preheat tank through a manifold system of copper tubes. These tubes are attached to black sheet-metal plates, thus enhancing absorption of solar radiation for preheating the water as it circulates to and from the preheat tank. Preheated city water is stored in the preheat tank and supplied, on demand, to a conventional 80-gallon DHW tank. When solar energy is insufficient to satisfy the space heating load, a water-to-air heat exchanger in the hot air supply-duct provides auxiliary energy for space heating. A gas-fired water heater provides auxiliary energy for the water-to-air heat exchanger and DHW. The system, shown schematically in Figure 1, has seven modes of operation.

Mode 1 - Collector-to-Storage: This mode activates when there is no demand for space heating and the collector supply-duct temperature is 26°F higher than the storage temperature. This mode terminates when the temperature difference between the collector and storage is less than 16°F.

Mode 2 - Storage-to-Space Heating: This mode activates when space heating is required (but is not available from the collector) and the storage temperature exceeds the building ambient temperature by 5°F. This mode terminates when the building ambient temperature equals the storage temperature or when space heating is no longer required.

Mode 3 - Collector-to-Space Heating: This mode activates when space heating is required and the collector supply-duct air temperature is 10°F higher than the building ambient air temperature. This mode terminates when the temperature difference drops to less than 6°F or the space heating requirement is satisfied.

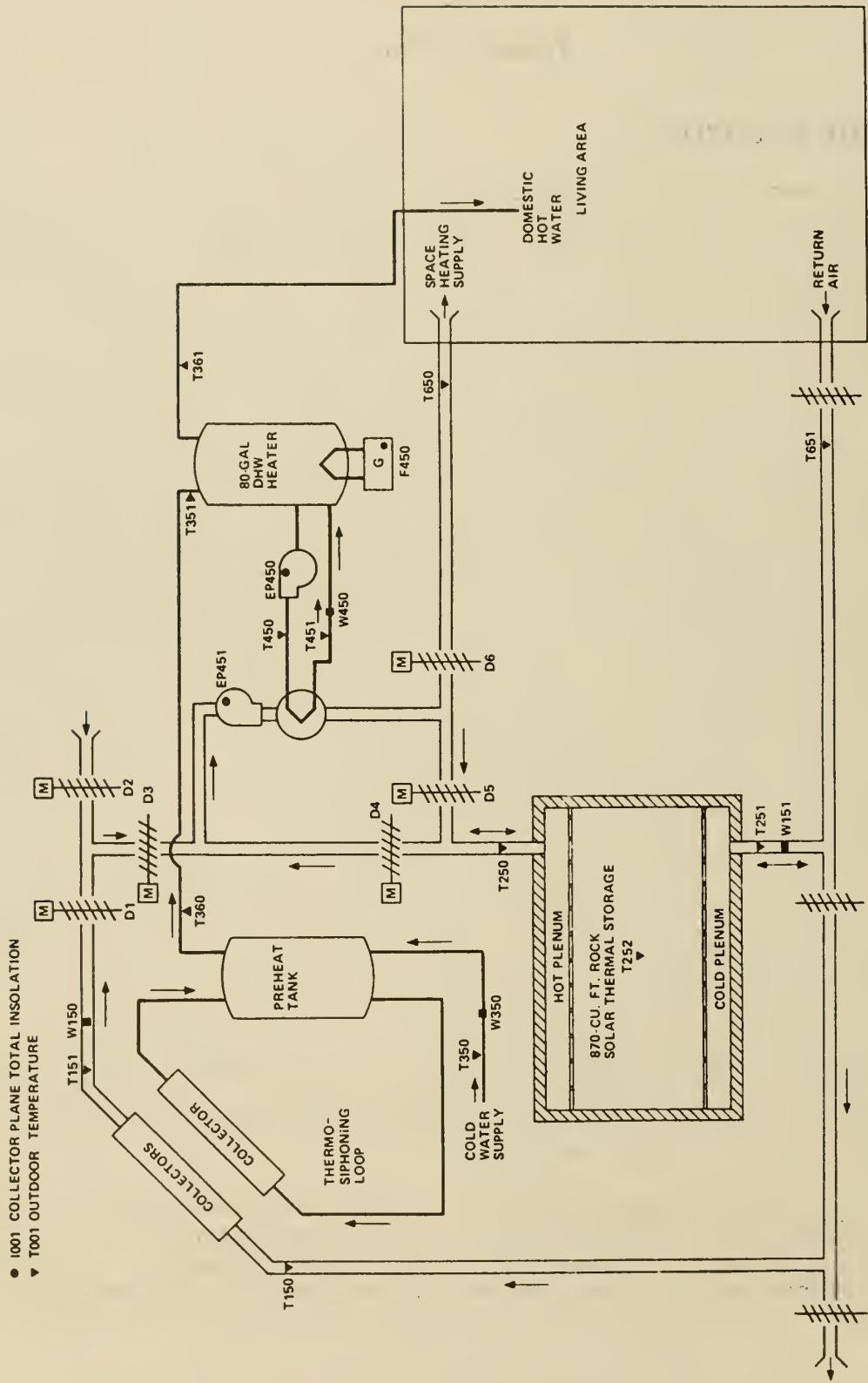


Figure 1. HELIO THERMICS, INC., LOT NO. 6, SOLAR ENERGY SYSTEM SCHEMATIC

Mode 4 - Auxiliary Energy-to-Space Heating: This mode activates when space heating is required and thermal energy is not available from the collectors or storage. An electrical heating element in the hot air supply-duct remains on until the space heating demand is satisfied.

Mode 5 - Summer Mode, Passive Cooling Storage: This mode can be activated when the residents wish to store cool air in storage for circulation the next day. The air-handler fan activates and an outside air-intake damper opens to allow the cool air to circulate through the attic and storage.

Mode 6 - Summer Mode, Space Cooling: This mode can be activated when cool air from storage is desired in the living area. The outside air-intake damper closes, the duct to the living area opens, and the air-handler fan activates.

Mode 7 - DHW Preheating: This mode activates when there is a demand for hot water. Water is drawn from the conventional DHW tank and replenished with heated water from the preheat tank. The DHW subsystem has this one independent mode of operation for preheating.

II. PERFORMANCE EVALUATION

INTRODUCTION

The site was occupied during the month of February and the solar energy system operated continuously during the month. The measurable solar energy satisfied 14 percent of the space heating requirements. The solar energy system provided fossil fuel energy savings of 1.1 million Btu.

To prevent the possibility of water freezing in the thermosiphoning subsystem, this solar energy system component (located in the attic) has been drained until warmer weather.

In this report the space heating load represents data from the last 14 days of February which was used and extrapolated to reflect the entire month. Because the average ambient temperature for the last 14 days was 43°F and the average for the first 14 days was 33°F, a significant bias has been introduced to some monthly totals. However, the data will provide some insight into solar energy system performance.

WEATHER CONDITIONS

During the month, total incident solar energy on the collector array was 13.3 million Btu for a daily average of 1146 Btu per square foot. This was below the estimated average daily solar radiation for this geographical area during February of 1715 Btu per square foot for a south-facing plane with a tilt of

51 degrees to the horizontal. The average ambient temperature during February was 38°F as compared with the long-term average for February of 44°F. The number of heating degree-days for the month (based on a 65°F reference) was 757, as compared with the long-term average of 577.

THERMAL PERFORMANCE

Collector - The total incident solar radiation on the collector array for the month of February was 13.3 million Btu. During the period the collector loop was operating, the total insolation amounted to 9.4 million Btu. The total collected solar energy for the month of February was 2.7 million Btu, resulting in a collector array efficiency of 20 percent, based on total incident insolation. Solar energy delivered from the collector array to storage was 2.0 million Btu. Energy loss during transfer from the collector array to storage and loads was 0.19 million Btu. This loss represented 7 percent of the energy collected. Operating energy required by the collector loop was 0.18 million Btu.

Storage - Solar energy delivered to storage was 2.0 million Btu. There were 0.20 million Btu delivered from storage to the space heating subsystem. Energy loss from storage was 1.7 million Btu. This loss represented 82 percent of the energy delivered to storage. This "lost" thermal energy is probably entering the living area and contributing to the lower-than-expected space heating load. The predicted space heating load based upon actual ambient temperature was 5.7 million Btu, considerably higher than the actual load of 2.9 million Btu. The storage efficiency was 18 percent: This is calculated as the ratio of the sum of the energy removed from storage and the change in stored energy, to the energy delivered to storage. The average storage temperature for the month was 64°F.

DHW Load - The DHW load was 2.4 million Btu, of which there was no solar contribution because the thermosiphoning subsystem was drained. A daily average of 91 gallons of DHW was consumed at an average temperature of 153°F delivered from the DHW tank.

Space Heating Load - The space heating subsystem consumed 0.68 million Btu of solar energy and 4.1 million Btu of auxiliary fossil fuel energy to satisfy a space heating load of 2.9 million Btu. This space heating load total reflects the bias introduced by using the last half of the February data as the basis for computing the monthly total. The solar fraction of this load was 14 percent. The space heating subsystem consumed a total of 0.58 million Btu of operating energy in order to distribute both solar energy and auxiliary thermal energy.

OBSERVATIONS

The instrumentation anomalies which created the need to extrapolate data have been corrected as a result of a site visit by IBM on February 14. Although unrelated, it was observed on February 16 that the gas totalizer used to

quantify the gas consumption is not providing valid data. The measurement of auxiliary thermal energy consumption in the DHW subsystem will not be available until this problem is corrected.

ENERGY SAVINGS

The solar energy system provided a total fossil fuel energy savings of 1.1 million Btu.

III. ACTION STATUS

Boeing will schedule a site visit in the near future in order to correct the erroneous gas totalizer data readings.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARYSITE: HELIOTHERMICS, INC., LOT 6, GREENVILLE, SC
REPORT PERIOD: FEBRUARY, 1979

SOLAR/ 1025-79/02

SITE/SYSTEM DESCRIPTION:

THE HELIOTHERMICS SOLAR ENERGY SYSTEM PROVIDES SPACE HEATING AND DOMESTIC HOT WATER PREHEATING. IN THE SPACE HEATING SUBSYSTEM, THERMAL ENERGY IS TRANSFERRED BY AIR CIRCULATION FROM THE ATTIC TO THE LOAD OR TO CRUSHED ROCK IN AN INSULATED CONCRETE BIN. IN THE DOMESTIC HOT WATER SUBSYSTEM, SOLAR ENERGY IS COLLECTED FROM A 70 SQ. FT. ALUMINUM AND COPPER PADDLE IN THE ATTIC AND TRANSFERRED TO AN 80 GAL. PREHEAT TANK BY THERMOSSIPHONING. AUXILIARY ENERGY IS PROVIDED TO BOTH SUBSYSTEMS BY A COMMON NATURAL GAS WATER HEATER.

GENERAL SITE DATA:
INCIDENT SOLAR ENERGY

COLLECTED SOLAR ENERGY

AVERAGE AMBIENT TEMPERATURE	2.849
AVERAGE BUILDING TEMPERATURE	0.14
EXCESS SOLAR CONVERSION EFFICIENCY	0.680
EXCESS OPERATING ENERGY	0.581
TOTAL SYSTEM OPERATING ENERGY	2.438
TOTAL ENERGY CONSUMED	0.438

SUBSYSTEM SUMMARY:

LOAD	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
SOLAR FRACTION	2.359	2.849	N.A.	5.437 MILLION BTU
SOLAR ENERGY USED	0.000	0.14	N.A.	1.2 PERCENT
OPERATING ENERGY	N.A.	0.680	N.A.	0.680 MILLION BTU
AUX. THERMAL ENERGY	4.254	0.581	N.A.	0.759 MILLION BTU
AUX. ELECTRIC FUEL	N.A.	2.438	N.A.	6.692 MILLION BTU
AUX. FOSSIL FUEL	7.090	0.438	N.A.	7.383 MILLION BTU
ELECTRICAL SAVINGS	N.A.	4.063	N.A.	-0.377 MILLION BTU
FOSSIL SAVINGS	0.000	-0.214	N.A.	1.133 MILLION BTU
		1.133	N.A.	

SYSTEM PERFORMANCE FACTOR:

0.79

* DENOTES UNAVAILABLE DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT
OF THE NATIONAL SOLAR DATA PROGRAM, FEBRUARY 28, 1978,
SOLAR/0004-78/18
READ THIS BEFORE TURNING PAGE

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: HELIOTHERMICS INC.; LOT 6, GREENVILLE, SC
REPORT PERIOD: FEBRUARY, 1979

SOLAR/1025-79/02

SITE/SYSTEM DESCRIPTION:

THE HELIOTHERMICS SOLAR ENERGY SYSTEM PROVIDES SPACE HEATING AND DOMESTIC HOT WATER PREHEATING. IN THE SPACE HEATING SUBSYSTEM, THERMAL ENERGY IS TRANSFERRED BY AIR CIRCULATION FROM THE ATTIC TO THE LOAD OR TO CRUSHED ROCK IN AN INSULATED CONCRETE BIN. IN THE DOMESTIC HOT WATER SUBSYSTEM, SOLAR ENERGY IS COLLECTED FROM A 70 SQ. FT ALUMINUM AND COPPER PADDLE IN THE ATTIC AND TRANSFERRED TO AN 80 GAL PREHEAT TANK BY THERMOSIPHONING. AUXILIARY ENERGY IS PROVIDED TO BOTH SUBSYSTEMS BY A COMMON NATURAL GAS WATER HEATER.

GENERAL SITE DATA:
INCIDENT SOLAR ENERGY

COLLECTED SOLAR ENERGY

AVERAGE AMBIENT TEMPERATURE	50 DEGREES C
AVERAGE BUILDING TEMPERATURE	20 DEGREES C
AVERAGE SOLAR CONVERSION EFFICIENCY	0.187 GIGA JOULES
ECSS OPERATING ENERGY	0.801 GIGA JOULES
TOTAL SYSTEM OPERATING ENERGY	8.279 GIGA JOULES
TOTAL ENERGY CONSUMED	

SUBSYSTEM SUMMARY:

	HEATING	COOLING	SYSTEM TOTAL
LOAD	2.489		5.736 GIGA JOULES
SOLAR FRACTION	3.00%		5.12 PERCENT
SOLAR ENERGY USED	0.000		0.717 GIGA JOULES
OPERATING ENERGY	N.A.		0.801 GIGA JOULES
AUX. THERMAL ENERGY	N.A.		7.060 GIGA JOULES
AUX. ELECTRIC FUEL	4.488		N.A. GIGA JOULES
AUX. FOSSIL FUEL	N.A.		4.625 GIGA JOULES
ELECTRICAL SAVINGS	7.480	-4.286	-0.398 GIGA JOULES
FOSSIL SAVINGS	N.A.	-C.225	
	0.000	1.195	1.196 GIGA JOULES

SYSTEM PERFORMANCE FACTOR:

0.79

* DENOTES UNAVAILABLE DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT
OF THE NATIONAL SOLAR DATA PROGRAM, FEBRUARY 28, 1978,
SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT ENERGY COLLECTION AND STORAGE SUBSYSTEM (ECSS)

SITE: HELIOTHERMICS, INC., LOT 6, GREENVILLE, SC
REPORT PERIOD: FEBRUARY, 1979

SOLAR / 1025-79/02

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	AMBIENT TEMP DEG-F	ENERGY TO LOADS MILLION BTU	AUX THERMAL TO ECSS MILLION BTU	ECSS OPERATING ENERGY MILLION BTU	ECSS ENERGY REJECTED MILLION BTU	ECSS SOLAR CONVERSION EFFICIENCY
1	0.899	26	0.088	N	0.012	N	0.098
2	0.662	28	0.051	0	0.010	0	0.078
3	0.086	38	0.008	0	0.001	0	0.102
4	0.794	43	0.023	0	0.000	0	0.029
5	0.252	34	0.041	A	0	0	0.165
6	0.053	30	0.000	P	0	0	0.002
7	0.092	32	0.000	P	0	0	0.009
8	0.842	32	0.016	0	0.007	0	0.040
9	0.874	31	0.034	L	0	0	0.080
10	0.822	25	0.065	I	0.011	0	0.054
11	0.870	30	0.047	C	0.012	0	0.096
12	0.543	38	0.052	A	0.005	0	0.034
13	0.632	38	0.021	B	0.009	0	0.082
14	0.271	38	0.022	E	0.002	0	0.002
15	0.202	54	0.000	E	0.002	0	0.130
16	0.510	59	0.001	E	0.002	0	0.141
17	0.306	33	0.039	E	0.002	0	0.016
18	0.077	20	0.011	E	0.002	0	0.481
19	0.926	32	0.015	E	0.001	0	0.021
20	0.788	36	0.016	E	0.001	0	0.016
21	0.060	41	0.029	C	0.008	0	0.000
22	0.359	51	0.005	C	0.000	0	0.072
23	0.076	52	0.000	C	0.000	0	0.001
24	0.043	50	0.003	C	0.003	0	0.019
25	0.189	47	0.014	C	0.001	0	0.037
26	0.390	39	0.018	C	0.014	0	0.019
27	0.935	41	0.050	C	0.015	0	0.065
28	0.783	45	0.000	N	0.177	N.A.	-
SUM	13.348	-	C.680	N.A.	0.	N.A.	-
AVG	0.476	38	0.024	N.A.	0.006	N.A.	0.051
NBS ID	Q001	N113		Q102		Q102	N111

* DENOTES UNAVAILABLE DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT PERFORMANCE

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/02
 REPORT PERIOD: FEBRUARY, 1979

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	OPERATIONAL INCIDENT ENERGY MILLION BTU	COLLECTED SOLAR ENERGY MILLION BTU	DAYTIME AMBIENT TEMP DEG F	COLLECTOR ARRAY EFFICIENCY
1	0.899	0.754	0.207	40	0.230
2	0.662	0.516	0.151	44	0.228
3	0.086	0.000	0.000	42	0.000
4	0.794	0.726	0.240	54	0.303
5	0.252	0.012	0.001	43	0.005
6	0.053	0.000	0.000	33	-0.012
7	0.092	0.000	0.000	33	-0.000
8	0.842	0.568	0.062	44	0.074
9	0.000	0.737	0.120	37	0.0138
10	0.874	0.651	0.173	39	0.0211
11	0.822	0.735	0.225	41	0.259
12	0.870	0.364	0.089	47	0.166
13	0.543	0.432	0.139	* * *	0.220
14	0.632	0.088	0.030	60	0.0114
15	0.271	0.094	0.016	69	0.082
16	0.202	0.419	0.207	69	0.407
17	0.510	0.025	0.003	34	0.011
18	0.306	0.000	0.000	18	0.000
19	0.077	0.680	0.078	45	0.085
20	0.926	0.627	0.164	52	0.209
21	0.788	0.620	0.000	41	-0.003
22	0.060	0.000	0.000	59	0.310
23	0.359	0.227	0.111	52	0.000
24	0.076	0.000	0.000	50	0.000
25	0.043	0.000	0.000	51	0.135
26	0.189	0.105	0.025	45	0.068
27	0.390	0.143	0.026	55	0.362
28	0.935	0.816	0.338	55	0.369
	0.783	0.672	0.289		
SUM	13.348	9.402	2.704	-	-
Avg	0.476	0.335	0.096	45	0.203
NBSID	Q001		Q100		N100

* DENOTES UNAVAILABLE DATA.
 N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
STORAGE PERFORMANCESITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC
REPORT PERIOD: FEBRUARY, 1979

DAY OF MONTH	ENERGY TO STORAGE MILLION BTU	ENERGY FROM STORAGE MILLION BTU	CHANGE IN STORED ENERGY MILLION BTU	STORAGE AVERAGE TEMP DEG F	STORAGE EFFICIENCY
					SOLAR/1025-79/02
1	0.139	0.068	-0.037	64	0.221
2	0.100	0.036	-0.006	63	0.300
3	0.000	-0.019	-0.006	63	1.000
4	0.175	-0.007	0.056	65	0.278
5	0.000	-0.018	-0.039	64	-98.757
6	0.000	-0.016	-0.008	64	77.791
7	0.000	-0.022	-0.020	63	1.000
8	0.059	-0.005	0.010	62	0.091
9	0.000	0.017	0.006	63	0.234
10	0.103	0.044	0.000	63	0.335
11	0.153	0.030	0.010	64	0.268
12	0.057	0.030	-0.011	63	0.325
13	0.114	0.018	-0.001	64	0.261
14	0.021	0.011	-0.002	63	0.426
15	0.133	-0.020	0.014	64	-0.435
16	0.165	-0.015	0.096	67	0.489
17	0.000	0.036	-0.094	66	-322.310
18	0.000	0.000	-0.033	64	1.000
19	0.093	-0.006	0.012	63	0.061
20	0.136	-0.012	0.035	64	0.357
21	0.000	0.017	-0.027	64	-801.862
22	0.075	-0.019	0.031	65	0.165
23	0.000	-0.001	-0.010	66	1.000
24	0.000	-0.017	-0.006	65	-1.726
25	0.017	-0.020	-0.010	65	-4.285
26	0.006	-0.024	-0.004	64	0.468
27	0.240	0.000	0.113	70	0.622
28	0.226	0.048	0.092		
SUM	2.035	0.198	0.172		
Avg	0.072	0.007	0.006		
NBS ID	Q200	Q201	Q202		
				64	0.182
					N108

* DENOTES UNAVAILABLE DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
HOT WATER SUBSYSTEM

SITE: HELIOTHERMICS, INC. ; LOT 6, GREENVILLE, SC
REPORT PERIOD: FEBRUARY 1979

SOLAR/1025-79/02

DAY OF MON.	HOT WATER LOAD MILLION BTU	SOLAR F.R. OF LOAD PER.	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	SUP. WAT. TEMP DEG F	HOT WAT. TEMP DEG F	HOT WATER USED GAL
1	0.067	*	0.000	0.008	0.000	0.000	0.000	0.000	43	141	70
2	0.036	**	0.000	0.167	0.000	0.000	0.000	0.000	45	151	41
3	0.113	**	0.000	0.000	0.210	0.000	0.000	0.000	49	153	152
4	0.035	**	0.000	0.000	0.098	0.000	0.000	0.000	44	148	40
5	0.044	**	0.000	0.000	0.300	0.000	0.000	0.000	39	153	93
6	0.090	**	0.000	0.000	0.003	0.000	0.000	0.000	41	156	75
7	0.073	**	0.000	0.000	0.137	0.000	0.000	0.000	40	152	89
8	0.133	**	0.000	0.000	0.142	0.000	0.000	0.000	38	153	140
9	0.081	**	0.000	0.000	0.080	0.000	0.000	0.000	41	156	89
10	0.027	**	0.000	0.000	0.129	0.000	0.000	0.000	36	144	55
11	0.066	**	0.000	0.000	0.096	0.000	0.000	0.000	39	147	77
12	0.119	**	0.000	0.000	0.145	0.000	0.000	0.000	43	153	134
13	0.134	**	0.000	0.000	0.131	0.000	0.000	0.000	45	153	67
14	0.059	**	0.000	0.000	0.080	0.000	0.000	0.000	49	156	67
15	0.036	**	0.000	0.000	0.125	0.000	0.000	0.000	46	157	124
16	0.036	**	0.000	0.000	0.065	0.000	0.000	0.000	51	153	133
17	0.131	**	0.000	0.000	0.129	0.000	0.000	0.000	52	154	101
18	0.142	**	0.000	0.000	0.096	0.000	0.000	0.000	31	153	101
19	0.096	**	0.000	0.000	0.065	0.000	0.000	0.000	34	155	157
20	0.145	**	0.000	0.000	0.125	0.000	0.000	0.000	43	159	159
21	0.080	**	0.000	0.000	0.065	0.000	0.000	0.000	44	156	156
22	0.129	**	0.000	0.000	0.134	0.000	0.000	0.000	50	159	159
23	0.096	**	0.000	0.000	0.000	0.000	0.000	0.000	53	161	156
24	0.145	**	0.000	0.000	0.000	0.000	0.000	0.000	50	161	156
25	0.080	**	0.000	0.000	0.000	0.000	0.000	0.000	47	161	107
26	0.125	**	0.000	0.000	0.000	0.000	0.000	0.000	50	161	136
27	0.029	**	0.000	0.000	0.000	0.000	0.000	0.000	48	161	107
28	0.103	**	0.000	0.000	0.188	0.000	0.000	0.000	50	149	132
											118
SUM				0.000	N.A.	4.254	N.A.	7.090	N.A.	0.000	-
AVG				0.000	N.A.	0.151	N.A.	0.253	N.A.	0.000	2547
NBS				0	N.A.	0	N.A.	0	N.A.	0	91
N302				N300	Q303	Q301	Q305	Q306	Q311	Q313	N308

* DENOTES UNAVAILABLE DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SPACE HEATING SUBSYSTEMSITE: HELIOTHERMICS INC, LCT 6, GREENVILLE, SC
REPORT PERIOD: FEBRUARY, 1979

SOLAR/ 1025-79/02

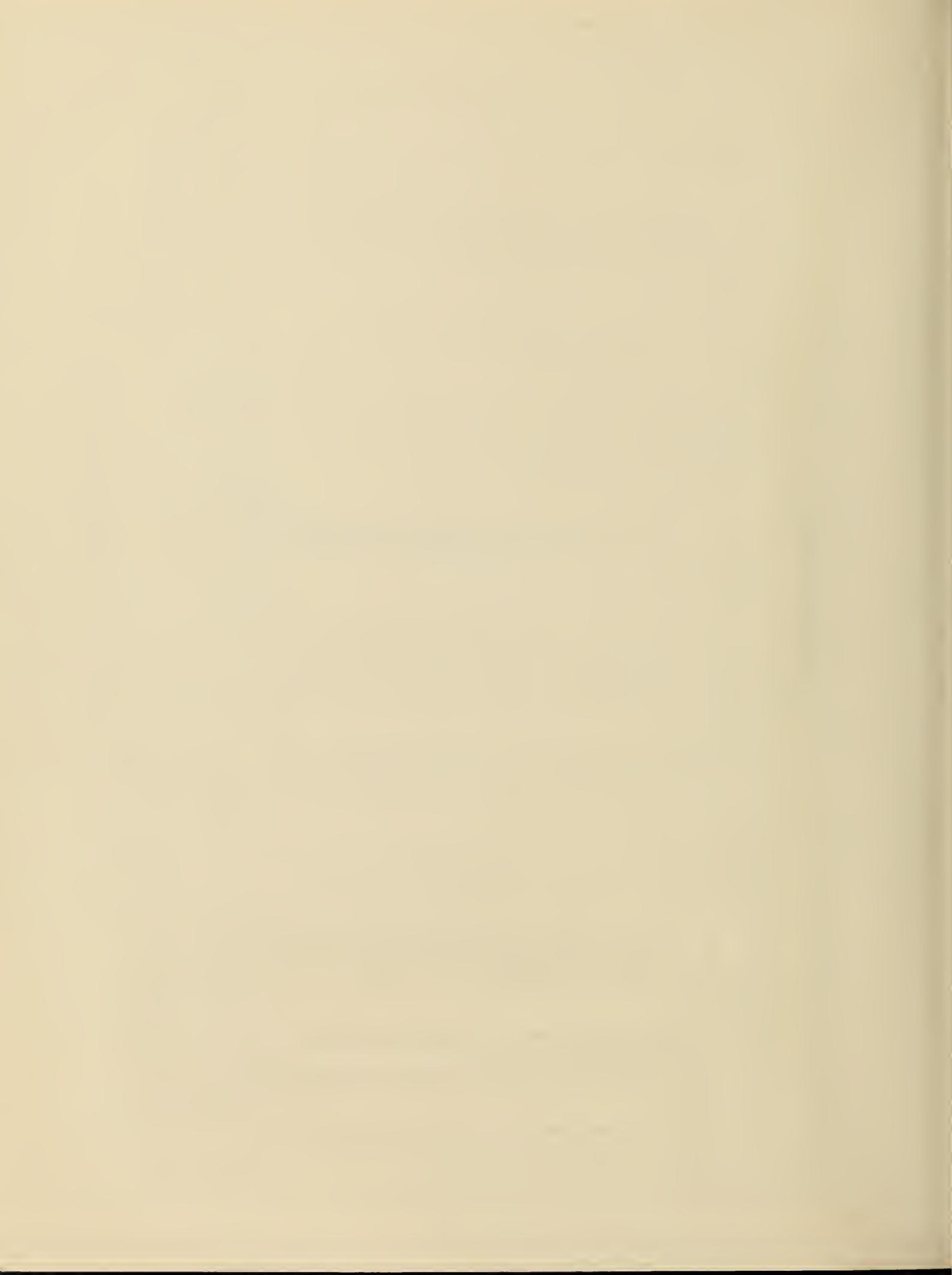
DAY OF MON.	SPACE HEATING LOAD BTU	SOLAR FR. OF LOAD PCT	SOLAR ENERGY USED. MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	BLDG AMB TEMP DEG. F	AMB TEMP DEG. F
1	123	*	0.088	0.032	0.031	0.023	0.019	0.147	0.086	67	26
2	145	*	0.051	0.018	0.005	0.023	0.010	0.038	0.014	67	28
3	166	*	0.023	0.041	0.000	0.015	0.008	0.069	0.038	68	38
4	187	*	0.041	0.010	0.000	0.015	0.016	0.000	0.000	69	43
5	198	*	0.021	0.000	0.000	0.015	0.015	0.000	0.000	69	34
6	209	*	0.016	0.016	0.000	0.015	0.015	0.000	0.000	68	30
7	2110	*	0.034	0.016	0.000	0.015	0.016	0.000	0.001	67	32
8	2121	*	0.065	0.016	0.000	0.015	0.016	0.000	0.001	67	25
9	2132	*	0.047	0.016	0.000	0.025	0.025	0.000	0.007	68	31
10	2143	*	0.052	0.022	0.000	0.021	0.027	0.000	0.005	68	38
11	2154	*	0.022	0.019	0.000	0.007	0.003	0.000	0.000	70	54
12	2165	*	0.015	0.019	0.000	0.021	0.027	0.000	0.002	72	59
13	2176	*	0.011	0.015	0.000	0.015	0.024	0.000	0.000	69	38
14	2187	*	0.015	0.015	0.000	0.015	0.024	0.000	0.000	70	59
15	2198	*	0.015	0.015	0.000	0.015	0.024	0.000	0.000	69	33
16	22010	*	0.016	0.016	0.000	0.015	0.025	0.000	0.000	69	32
17	22111	*	0.016	0.016	0.000	0.029	0.029	0.000	0.000	69	36
18	22212	*	0.067	0.007	0.000	0.008	0.067	0.000	0.000	69	41
19	22313	*	0.027	0.007	0.000	0.010	0.021	0.000	0.000	71	51
20	22414	*	0.067	0.007	0.000	0.009	0.067	0.000	0.000	71	52
21	22515	*	0.093	0.033	0.000	0.015	0.089	0.000	0.005	69	47
22	22616	*	0.153	0.014	0.000	0.020	0.139	0.000	0.024	69	39
23	22717	*	0.094	0.018	0.000	0.018	0.076	0.000	0.030	68	41
24	22818	*	0.050	0.050	0.000	0.015	0.000	0.000	0.084	70	45
SUM	2.849	-	0.680	0.581	2.438	N.A.	4.063	-0.214	1.133	-	-
Avg	0.101	14	0.024	0.020	0.087	N.A.	0.145	-0.007	0.040	69	38
NBS	Q402	N400	Q400	Q403	Q401		Q410	Q415	Q417	N406	N113

* DENOTES UNAVAILABLE DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENVIRONMENTAL SUMMARY

* DENOTES UNAVAILABLE DATA.
N.A. DENOTES NOT APPLICABLE DATA.









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